Responses to CDH Comments on April 1994
Draft Final Technical Memorandum #11
Development and Screening of Remedial Action Alternatives
881 Hillside Area (Operable Unit 1)
Rocky Flats Plant

General Comments

Comment 1

Information Necessary to Support a Corrective Action Decision The CMS/FS must contain sufficient information to fully support a corrective action decision by the Division for each IHSS and source area in OU-1 The Division is concerned that the current scope of the development of remedial alternatives may not meet our needs in making these decisions

The development of remedial action alternatives must start at the IHSS and source level Corrective measures must be selected for each IHSS and source area that are fully protective and meet the appropriate RAOs The number and range of alternatives evaluated for each IHSS may be limited by the scope and complexity of contamination and availability of treatment options Alternatives selected for each IHSS should then be combined to form a range of remedial action alternatives for the operable unit When appropriate, IHSSs with similar effective alternatives can be combined to achieve economies of scale Alternatives developed at the operable unit level should provide the range of alternatives prescribed in EPA guidance

The combining of technology options into alternatives for each IHSS and the integration of IHSS alternatives into remedial action alternatives for the OU should not be distinct steps Rather, the final range of alternatives developed of the operable unit should be the product of an iterative process of integrating and optimizing technology options considering screening criteria at the IHSS, operable unit and facility scale, simultaneously It is not necessary to evaluate or screen every potential combination of alternatives at the IHSS or OU level

The no action alternative should be presumed in areas where no contamination was determined to be present If an IHSS with contamination is determined to be currently protective and meets all applicable RAOs, a presumptive remedy of no action may be proposed IHSSs where no action is proposed on the basis of protectiveness must include sufficient justification to support the finding The Division considers an excess cancer risk of 1*10^-6 and hazard index of unity to be protective of human health Remedies must also be protective of ecological receptors and environmental resources such as groundwater

Response

DOE does not agree that individual IHSSs should be examined for remedial action alternatives The IAG states that the CERCLA RI/FS guidance should be used as the template for conducting OU CMS/FSs The IAG also establishes the OU concept and recognizes the need for evaluating remedial actions at the OU level

Implementing the CMS/FS on an IHSS by IHSS basis is neither practical nor cost-effective Groundwater remediation cannot be evaluated strictly through individual IHSSs For example groundwater contamination at the eastern edge of the operable unit has not been definitively tied to any one IHSS This area therefore could not be evaluated through an individual IHSS CMS/FS The OU 1 CMS/FS report addresses groundwater contamination where it occurs and attempts to identify source locations through the Phase III RFI/RI data This approach is consistent with groundwater remediation strategies applied to other sites across the nation

The Division states that a no action alternative should be presumed in areas where no contamination was determined to be present, or where the area is currently protective of human health and the environment The division goes on to specify that the 1×10^{-6} risk level and hazard index of unity is considered protective DOE believes that this approach is again inconsistent with CERCLA guidance and the IAG Risk assessment numbers are not available for individual IHSSs and therefore cannot be used to determine if an area is protective

In an attempt to meet the request of the Division the OU 1 CMS/FS includes a table which summarizes individual IHSSs and states how they are accounted for through the alternative development process In addition the OU-1 CMS/FS report proposes to consider OU 1 a single Corrective Action Management Unit (CAMU) under RCRA to address identified groundwater contamination and possible residual DNAPLs

Comment 2

Effectiveness of Remedial Action to Protect Ecological Environment The general assumption that remedial actions that are protective of human health will adequately protect ecological receptors at OU-1 is not always appropriate Not all remedial actions that meet human health RAOs will necessarily be protective of the environment For example, institutional actions such as site access and use restrictions will not reduce access and exposure of small animals The effectiveness of an alternative to protect ecological receptors must be considered in the development and screening of alternatives

Response

In most cases this comment is appropriate However, in the case of OU-1 the EE portion of the Phase III RFI/RI did not identify any significant hazards to ecological receptors Specifically, the EE found that while some contaminants occur at potentially toxic levels the contaminated areas are not large enough to result in a significant threat to the populations of plants or animals and that " the restricted distribution limits the duration and frequency at which ecological receptors may contact contaminants thus limiting exposure Therefore for the OU 1 CMS/FS, it is assumed that since no current significant hazards exist for these receptors RAOs protective of human health will also be protective of ecological receptors

Comment 3

Evaluation of Existing IM/IRA The existing IM/IRA is not fully or accurately characterized or evaluated in this TM Evaluation of the IM/IRA is based on dated material and does not

accurately characterize the effectiveness of either the french drain, collection well or treatment facility

The conclusion that the french drain would not provide an effectiveness in protecting human health or the environment much greater than institutional controls is not accurate The concentration of contaminants in the influent water can not be directly correlated to the effectiveness of the french drain Footing drain water which is not contaminated contributes a significant percentage of the influent water effectively diluting the contaminants collected by the french drain and collection well Discontinuation of the collection and treatment of footing drain water was recently proposed by DOE The dilution of influent water was not considered in concluding that the french drain would not increase protectiveness over institutional actions Also the potential for contamination to migrate into the french drain in the future was not considered

The Building 891 treatment facility has recently been shown to be ineffective in treating carbon tetrachloride and would subsequently require modification to treat extracted groundwater This fact should be considered in evaluation of this treatment option

Response

The Phase III RFI/RI report concludes that the french drain system is effective in containing contaminants migrating from the IHSS 119 1 source area However, groundwater modeling conducted as part of the OU 1 CMS/FS indicates that contaminant concentrations will not exceed Federal or State MCLs at the Woman Creek boundary This location represents the closest realistic exposure point for a human receptor to groundwater originating in OU 1 Operation of the french drain merely replaces natural attenuation as a removal mechanism without significantly affecting compliance with ARARs or protection of human health and the environment

For alternative comparison the existing french drain system and corresponding water treatment plant have been retained for alternative development and detailed analysis, and are included in several remedial action alternatives The OU 1 CMS/FS also references potential modifications to the UV/peroxide treatment system necessary to allow the system to treat water originating from OU 1 or from other operable units

Comment 4

Transfer of Remediation of Surficial Radionuclide Contamination with OU 2 The Division recognizes the utility of conducting remediation of surficial soil radioactive contamination in OU 1 under OU 2 However, this transfer has yet to be formally proposed by DOE or approved by EPA and CDH This proposal must include detailed documentation of the contaminants and media for which remediation are to be transferred to OU 2 In addition responsibility for the remediation of radionuclide hot spots and non radionuclide (PAH and PCB) contaminated surficial soils must be clearly documented

Response

The administrative transfer of OU 1 surface soils to OU 2 is documented in a letter to Mr Martin Hessmark of the U S EPA Region VIII, and to Mr Gary Baughman of the Colorado Department of Health dated June 30 1994 (Ref 94 DOE 07024) In addition the assessment of surface water and sediments in the SID and Woman Creek is being addressed under OU 5 as discussed in the EPA letter dated January 12 1994

Comment 5

Remediation of OU 1 Surface Water and Sediments The Division requests a formal proposal from DOE documenting DOE's intent to investigate and remediate surface water and sediments at OU 1 under OU 5 This proposal must include details on the areas, media and contamination to be transferred

Response

The IAG specifies the contents of individual operable units Sediments and surface waters associated with Woman Creek are currently identified as OU 5 areas In addition the assessment of surface water and sediments in the SID and Woman Creek is discussed in the EPA letter dated January 12 1994

Comment 6

Remediation of Radionuclide Hot Spots at OU 1 The Division is unclear how the DOE plans to conduct radionuclide hot spot remediation at OU 1 The remediation of radionuclide contamination at OU 1 must be fully considered in the development and selection of remedial alternatives The technical memorandum states on page 2 2, It is assumed that implementation of any groundwater GRA presented below would include removal and temporary storage of this [radionuclide hot spot] contaminated soils This statement is not accurate, several groundwater GRAs are listed that would not necessarily require the removal of radionuclide hot spots The Division requires that DOE include alternatives for surface soil hot spot remediation in the OU 1 remedy selection process

Response

Remediation of radionuclide hotspots is currently being conducted under a proposed action memorandum (PAM) GRAs were not identified for these hotspots because it is assumed that they will not be present when remedial actions are initiated for OU 1 Remedial action alternatives were not developed for these areas for the same reason

Comment 7

Management Options for Treatment Residuals The development and screening of alternatives must include options for the management and ultimate disposition of any treatment or removal residuals Many of the alternatives developed in this technical memorandum could generate

significant volumes of treatment residuals that may need to be managed as hazardous radioactive, or mixed waste

Response

The OU 1 CMS/FS report contains more information concerning management of residuals Under certain alternatives significant quantities of residual waste may be generated and should be addressed The detailed analysis of alternatives is intended to address these issues and does so in the OU 1 CMS/FS report under the criteria of Reduction of Toxicity, Mobility, or Volume through Treatment T M #11 does not evaluate the nine criteria specified in the CERCLA guidance for detailed analysis

Comment 8

Interface of CMS/FS with Sitewide Treatability Studies and IM/IRAs Several of the process options and alternatives discussed in this technical memorandum have been or are currently being evaluated by DOE at Rocky Flats, such as the sitewide treatability study program and IM/IRAs Based on the review of this document, it appears to the Division that technical staff conducting studies directly applicable to remediation of OU 1 have not been utilized in the development and screening of alternatives Many of the statements and assumptions presented in this technical memorandum regarding these projects and related alternatives are outdated or inaccurate It is critical to the development of remedial action alternatives that DOE utilize all available resources The Division recommends that DOE confer with personnel conducting these studies and update this technical memorandum to include the most current and accurate information available

Response

Sitewide treatability study data were evaluated in developing and screening the list of technologies available for OU-1 The OU 1 CMS/FS report includes information from ongoing soil vapor extraction studies and references the scheduled ohmic heating demonstration Other treatability studies will also be used if appropriate during remedial design Note that although some treatability studies currently in progress at the RFETS may apply to contaminants found in OU 1 they do not necessarily apply to the site conditions For example bioremediation is considered a potential technology for remediation of chlorinated solvents, however implementation of the technology at OU 1 is not considered feasible

Specific Comments

Section 2 1 General Response Actions

Comment 1

Media of Concern for General Response Actions The Division does not agree with the statement on page 2 2 that groundwater is the only medium of concern at OU-1 that requires general response actions In order to fully address the remedial action objectives for OU 1

medium specific general response actions must be fully developed for all media impacted by OU 1 contamination This should include all contamination sources contaminated surface and subsurface soils, and contaminated groundwater

Response

The RAOs and alternative descriptions have been revised in the OU 1 CMS/FS report to clarify that subsurface soil sources of DNAPL will be remediated under certain alternatives However GRAs cannot be developed specifically for the medium of subsurface soils since there is no risk identified for this medium nor do the contaminants in the medium exceed chemical specific ARARs associated with subsurface soils (none are identified)

Comment 2

Complete Documentation of General Response Actions Several general response actions are currently assumed by this technical memorandum to be part of groundwater remediation alternatives but are not formally documented as such For example, the text states (page 2 2 paragraph 3) that groundwater GRA assume the removal of radionuclide hot spots though removal of the hot spots is not covered elsewhere in the TM It is critical to the development and screening of remedial action alternatives that the complete list of all GRA for each alternative be considered The description of each GRA must include a complete description of all actions singly or in combination, that may be taken to satisfy the remedial action objectives for an area

Response

See response to General Comment #6

Comment 3

List and Description of General Response Actions The list and brief description of groundwater GRA on page 2 3 is incomplete and confusing The list of GRA is the foundation on which remedial alternatives are developed and evaluated, it is imperative that GRA and associated process options be clearly presented and described in this TM Each general response action must clearly specify the action(s) media and as appropriate, contamination to be targeted For example in situ treatment of chlorinated solvents in subsurface soils and in situ removal of chlorinated solvents from subsurface soils with ex situ treatment are different general response actions for subsurface soils

Additionally it is not clear to the Division why removal ex situ treatment of chlorinated solvents and some options for in situ treatment of chlorinated solvents are considered separate GRA for groundwater It is the Division s understanding that under most of the process options being considered under these GRA groundwater is to be removed and treated at the Building 891 treatment facility

Response

The designation of GRAs follows commonly accepted terminology and EPA guidance

Comment 4

Volume and Area Estimates This section should be expanded to include area and volume estimates for all media for each IHSS or source area at OU 1 to which general response actions might be applied This must include estimates of the probable location of solvents at IHSS 119 1 including potential residual in soils and/or pools at the top of bedrock To aid in the presentation and understanding of areas and volumes being considered for remediation maps of each area should be included in the CMS/FS report

Response

This section is revised in the OU 1 CMS/FS report, however, the CMS/FS report cannot elaborate further on nature and extent of contamination than the Phase III RFI/RI report Nature and extent of contamination is defined to the maximum extent practical in the RFI/RI Further definition is unlikely to be attainable due to the difficulty involved in characterizing DNAPL contamination The OU 1 CMS/FS report attempts to summarize the Phase III findings without reinterpreting the data Volume and area estimates have been included where appropriate

Section 2 2 Identification and Screening of Technologies and Process Options

Comment 5

Initial Screening of Technologies and Process Options The Division offers the following comments regarding the screening of technology options and process options presented in Figure 2 3

- The no action alternative should not include references to institutional controls as part of long-term monitoring Institutional controls are an action No further action would include no institutional controls

- The Division recommends that the Institutional Control GRA be renamed to Institutional Actions Monitoring should be included as a remedial technology option under institutional actions

- The Removal GRA should be a combination of actions including removal and treatment and/or release of groundwater The potential for residual or free phase DNAPL at IHSS 119 1 must be considered in the screening of process options for that source area In addition removals must consider storage issues

- Several process options listed under physical remedial technology for in situ treatment of chlorinated solvents are not treatment technology and are more appropriately classified as in situ removal of solvents from groundwater

- The fact that bioremediation is currently undergoing treatability studies at RFP should be included in screening comments The objectives of the bioremediation treatability study and the studies usefulness in evaluating bioremediation alternatives at OU 1 must be addressed

Response

The list has been reviewed for the OU 1 CMS/FS, however the list is not included in the main body of the text due to its prior presentation in TM #11

Section 2 3 Evaluation and Selection of Representative Process Options

Comment 6

Selection of Process Options for Alternative Development The Division requests that additional information be included in this section documenting how and why specific process options were selected for inclusion and others excluded in the selection of process options for developing alternatives

Response

The OU 1 CMS/FS contains additional information regarding process options retained for alternative analysis

Comment 7

Page 2 20, First Paragraph The statement that bioremediation and soil flushing were not viewed favorably in the selection of process options is confusing and inconsistent with other sections of this technical memorandum While soil flushing is not identified as a process option in either Figure 2 3 or 2-4 it is selected in alternative 3 groundwater removal by pumping Alternative 3 is the injection of water up-gradient and extraction down-gradient of the source areas Use of a similar treatment train for bioremediation would not increase the potential for further migration of contaminants into bedrock and would have the additional benefit of treating contamination in the bedrock Soil flushing should be included in the development and screening of process options Soil flushing as well as bioremediation and other in situ treatment alternatives should be considered as the selection of representative process options equally, without undue bias

Response

Soil flushing and groundwater extraction with reinjection are separate remedial action approaches In the case of OU 1 soil flushing is not considered a viable option for remediation The alternatives presented in T M #11 have been revised to address consistency issues, although it should be noted that reinjection of extracted water does not necessarily equate to complete saturation of the subsurface to affect bioremediation or soil flushing

Comment 8

Minimize Potential for Contaminant Migration The elimination of soil flushing and bioremediation from consideration because of concerns about forcing contamination further into the bedrock system appears to be inconsistent with alternative 3 in Section 3 3 4 This alternative is called groundwater removal by pumping and includes the injection of clean water up-gradient to flush contaminated groundwater from the soils The evaluation of the effectiveness of this alternative does not include concerns about contaminant migration

Response

See response to Specific Comment #7

Section 3 4 Existing IM/IRA Treatment System

Comment 9

Effectiveness of Existing IM/IRA Treatment Facility The selection of process options for alternative development was biased towards selection of the existing IM/IRA treatment system for treating extracted groundwater This section incorrectly states that the existing IM/IRA treatment system is proven to be effective in treating the contaminants present at OU 1 This document must state that the existing system may require modification to provide adequate treatment of extracted groundwater Discussions regarding the existing IM/IRA treatment system should be reviewed and most recent accurate information regarding the IM/IRA treatment system included in this technical memorandum and the CMS/FS report

Response

See response to General Comment #3

Section 3 Development and Screening of Alternatives

Comment 10

Scope of Development and Screening of Alternatives This section should be expanded to include the development and screening of remedial action alternatives for each IHSS at OU 1 The process by which technology options were assembled into alternatives is not clear from this document The Division requests that additional information be added to this report documenting how process options developed in Section 2 were combined into the alternatives presented in Section 3 The Division recommends that the range of alternatives developed for each site include some intermediate actions

Response

See responses to General Comment #1 and Specific Comment #6 It is unclear from the comment what actions are considered "intermediate" The OU-1 CMS/FS report includes four

no action or institutional control alternatives, and four removal or treatment alternatives At the request of the Division and EPA most of these alternatives were carried forward for detailed analysis

Section 3 1 Development of Remedial Action Alternatives

Comment 11

Development of Alternatives on a Medium Specific Basis The Division does not believe that it is appropriate to develop remedial action alternatives on a medium specific basis EPA guidance recommends assembling alternatives by combining GRA and process options selected for each medium to form alternatives for the site In the case of IHSS 119 1, alternatives must be developed that include the remediation of subsurface soils as well as groundwater The Division recommends that the alternatives assembled in this section be reviewed to ensure that they address all media of concern at each site within OU-1

Response

See response to Specific Comment #1

Comment 12

Description of Process Options Represented by Alternatives The Division requests that additional information on those process options that were not screened out and that are represented by those described in the alternatives be included in the description of each alternative in this section

Response

The level of detail presented in the technical memorandum is consistent with that suggested by EPA s RI/FS guidance Additional information is provided for process options included in remedial action alternatives in the detailed analysis of alternatives

Section 3 2 Screening of Alternatives

Comment 13

Refinement of Alternatives Prior to Screening The process options selected for the remediation of groundwater should be combined with process options selected for the remediation of other media at each site during the development of alternatives At this point in the process, such aspects as interaction among media and sitewide protectiveness requirements have usually not been fully developed Therefore, refinements to each alternative should be considered to ensure the alternative is protective of human health and the environment The process of refining alternatives is described in Section 4 3 1 of EPA s Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA The Division recommends that information of the refinement of remedial alternatives be included in the screening of alternatives

presented in this technical memorandum

Response

The process described in Section 4 3 1 of the EPA RI/FS guidance refers to targeted media that contribute a risk or exceed ARAR based standards The Phase III RFI/RI does not indicate that media other than OU 1 groundwater meet these criteria Also see response to Specific Comment #1

The refinements discussed in this comment are appropriate for sites with several media targeted for remediation The guidance is intended to be applied where appropriate and must consider site conditions The OU 1 CMS/FS report follows the EPA CERCLA guidance as appropriate and focuses on the relevant medium determined to contribute a risk to human and/or ecological receptors

Section 3 3 Groundwater Remedial Action Alternatives

Comment 14

Page 3 10, last sentence The Division disagrees with DOE s conclusion that the french drain would not provide much greater protectiveness than institutional controls with no active treatment applied The operation of the french drain during the time frame specified in this section included the collection and treatment of Building 881 footing drain water as well as french drain and collection well sump water, causes substantial dilution of french drain contaminants The fact that any contamination was detected in the influent water is strong evidence to suggest that the french drain and collection well are effective in reducing the toxicity mobility and volume of contaminants

Response

See response to General Comment #3

Comment 15

Page 3 11, first sentence The statement, Particularly in light of the fact that the effluent storage tanks used for the treatment system may be contributing to the contaminant concentrations in the treated water is neither accurate or relevant and should be deleted

Response

See response to General Comment #3

Comment 16

Page 3 11, Implementability Evaluation While existing fencing and site check points provide physical barriers to access to the Rocky Flats Plant the Division does not believe that the

current physical barriers [comment not completed]

Response

The comment is not complete and cannot be addressed

Comment 17

Alternative 4b and 5b The Division does not believe that the implementation of RF/Ohmic Heating with SVE or Stream Injection/Mechanical Mixing over the entire operable unit is practical or appropriate for consideration as alternatives

Response

Sitewide application of these technologies was intended to address contaminants outside of IHSS 119 1 The actual areal extent of the remediation would be determined during remedial design The OU 1 CMS/FS report does not specify sitewide treatment under any alternative Treatments applied to areas other than IHSS 119 1 would be justified through additional soil gas surveys and performance monitoring

Section 3 4 Summary of Alternative Screening

Comment 18

Removal of Alternatives 2 and 3 The removal of both Alternatives 2 and 3 from further consideration is based on inaccurate information regarding the performance of the french drain and collection well The removal of these alternatives from further consideration must be reassessed using current and accurate information Solid rationale must be clearly stated before these alternatives are removed

Response

See response to General Comment #3

Section 4 0 Potential Action Specific ARARs and TBCs

Comment 19

Potential ARARs The Division is currently reviewing the potential ARARs and TBCs proposed in this section Comments on the selection of potential ARARs will be sent under separate cover The early identification of ARARs is critical to the efficient development and selection of appropriate remedial action for OU 1 The Division is disappointed that DOE has failed to specify representatives for the ARARs working group, proposed by CDH in January 1994

Response

DOE recognizes that the early identification of ARARs is critical to completing the detailed analysis of alternatives Since the referenced comments which are pending have yet to be provided by the Division DOE is proceeding with the ARARs approach initiated in T M #11